LBNE LAr Parameters Spreadsheet

Version 10.6 - 11/4/2011 Changes highlighted in RED 33 kton

Quality Meaning

Input value
Calculated
Reference Design, 800'

*** Stable, well understood parameter

** Reasonably well defined parameter

Rough estimate

			Qual		
Parameter	Value	Units	ity	Req ID	Notes
Anode Plane Assembly (APA)					
Cathode Plane Assembly (CPA)					
Detector Module					
Cryostat module					
Electronics					
High Voltage					
Cryogenics					
Detector Depth					
Radioactive Background					
Veto System					
Veto Configuration					
Veto Counter					
Photon Detector					
Num paddles per APA	10		**		
Num PMT's per paddle	10				
Paddle acrylic thickness	0.48		*		
Paddle acrylic width		cm	*		
Paddle acrylic length	200		*		
Total num PMT's for 2 cryostats	2160				
Sensitivity at 3.7 m	0.1	PE/MeV	*		For a MIP
			*		2 ppm nitrogen contamination will start interfering with 3 m
Maximum N2 contamination	1.9	ppm	*		to 4 m photon transmission in LAr
DAQ	Cantinuana		***		Nooded for adl. CN
DAQ readout mode DAQ hit rate	Continuous		444		Needed for pdk, SN
DAQ samples/hit					
Data rate: beam events			+		
Data rate: non-beam events					
Data compression factor					
Cavern & Pit					
			Τ		Allow 20m for cryo equipment and loading dock. 2 cryostats
Highbay length	139.2	m			end to end.
Highbay width	32.1	m			3 m aisleway on both sides
Highbay height	6	m	*		Excluding TPC loading zone
Highbay volume	26851	m^3			
8					
Primary access	Drive-in		**		
	existing drifts		**		
Primary access Secondary access Concrete pit thickness	existing drifts 0.5				
Primary access Secondary access Concrete pit thickness Pit Width	existing drifts 0.5 26.1	m	***		Inside dimension to finished concrete
Primary access Secondary access Concrete pit thickness Pit Width Pit Depth	existing drifts 0.5 26.1 18.0	m m	***		Inside dimension to finished concrete
Primary access Secondary access Concrete pit thickness Pit Width Pit Depth Pit Length per cryostat	existing drifts 0.5 26.1 18.0 50.6	m m m	***		Inside dimension to finished concrete from finished concrete wall at each end
Primary access Secondary access Concrete pit thickness Pit Width Pit Depth Pit Length per cryostat Septum pit clear width	existing drifts 0.5 26.1 18.0 50.6 15.0	m m m m	***		Inside dimension to finished concrete from finished concrete wall at each end space for purification system
Primary access Secondary access Concrete pit thickness Pit Width Pit Depth Pit Length per cryostat Septum pit clear width Setpum wall thickness	existing drifts 0.5 26.1 18.0 50.6 15.0 1.5	m m m m	***		Inside dimension to finished concrete from finished concrete wall at each end
Primary access Secondary access Concrete pit thickness Pit Width Pit Depth Pit Length per cryostat Septum pit clear width Setpum wall thickness Septum total width	existing drifts 0.5 26.1 18.0 50.6 15.0 1.5 18.0	m m m m m	***		Inside dimension to finished concrete from finished concrete wall at each end space for purification system calculated to withstand hydrostatic pressure
Primary access Secondary access Concrete pit thickness Pit Width Pit Depth Pit Length per cryostat Septum pit clear width Setpum wall thickness Septum total width Pit length for two cryostats	existing drifts 0.5 26.1 18.0 50.6 15.0 1.5 18.0 119.2	m m m m m m	***		Inside dimension to finished concrete from finished concrete wall at each end space for purification system
Primary access Secondary access Concrete pit thickness Pit Width Pit Depth Pit Length per cryostat Septum pit clear width Setpum wall thickness Septum total width Pit length for two cryostats Pit Volume per cryostat	existing drifts 0.5 26.1 18.0 50.6 15.0 1.5 18.0 119.2 23791	m m m m m m m m m m m m m m	***		Inside dimension to finished concrete from finished concrete wall at each end space for purification system calculated to withstand hydrostatic pressure
Primary access Secondary access Concrete pit thickness Pit Width Pit Depth Pit Length per cryostat Septum pit clear width Setpum wall thickness Septum total width Pit length for two cryostats	existing drifts 0.5 26.1 18.0 50.6 15.0 1.5 18.0 119.2	m m m m m m m m m m m m m m	***		Inside dimension to finished concrete from finished concrete wall at each end space for purification system calculated to withstand hydrostatic pressure
Primary access Secondary access Concrete pit thickness Pit Width Pit Depth Pit Length per cryostat Septum pit clear width Setpum wall thickness Septum total width Pit length for two cryostats Pit Volume per cryostat Pit Surface Area per cryostat Maximum angle of incline/decline for drive-in access	existing drifts 0.5 26.1 18.0 50.6 15.0 1.5 18.0 23791 5407	m m m m m m m m m m m m m m	***		Inside dimension to finished concrete from finished concrete wall at each end space for purification system calculated to withstand hydrostatic pressure
Primary access Secondary access Concrete pit thickness Pit Width Pit Depth Pit Length per cryostat Septum pit clear width Setpum wall thickness Septum total width Pit length for two cryostats Pit Volume per cryostat Pit Surface Area per cryostat Maximum angle of incline/decline for drive-in access Maximum angle of incline/decline for drifts other than	existing drifts 0.5 26.1 18.0 50.6 15.0 1.5 18.0 23791 5407	m m m m m m m m m m m compared to the second	***		Inside dimension to finished concrete from finished concrete wall at each end space for purification system calculated to withstand hydrostatic pressure
Primary access Secondary access Concrete pit thickness Pit Width Pit Depth Pit Length per cryostat Septum pit clear width Setpum wall thickness Septum total width Pit length for two cryostats Pit Volume per cryostat Pit Surface Area per cryostat Maximum angle of incline/decline for drive-in access Maximum angle of incline/decline for drifts other than drive-in access	existing drifts 0.5 26.1 18.0 50.6 15.0 1.5 18.0 23791 5407	m m m m m m m m m m m comparison of the comparis	*** ** ** ***		Inside dimension to finished concrete from finished concrete wall at each end space for purification system calculated to withstand hydrostatic pressure from finished concrete wall at each end
Primary access Secondary access Concrete pit thickness Pit Width Pit Depth Pit Length per cryostat Septum pit clear width Setpum wall thickness Septum total width Pit length for two cryostats Pit Volume per cryostat Pit Surface Area per cryostat Maximum angle of incline/decline for drive-in access Maximum angle of incline/decline for drifts other than drive-in access Pit floor tolerance to horizontal plane	existing drifts 0.5 26.1 18.0 50.6 15.0 1.5 18.0 23791 5407 12 15 0.1	m m m m m m m m m m m 2 degrees degrees	*** ** ** ** ***		Inside dimension to finished concrete from finished concrete wall at each end space for purification system calculated to withstand hydrostatic pressure from finished concrete wall at each end Maintain LAr cover over detector & proper ullage.
Primary access Secondary access Concrete pit thickness Pit Width Pit Depth Pit Length per cryostat Septum pit clear width Setpum wall thickness Septum total width Pit length for two cryostats Pit Volume per cryostat Pit Surface Area per cryostat Maximum angle of incline/decline for drive-in access Maximum angle of incline/decline for drifts other than drive-in access Pit floor tolerance to horizontal plane Pit concrete flatness requirement	existing drifts 0.5 26.1 18.0 50.6 15.0 1.5 18.0 119.2 23791 5407 12 15 0.1 +/- 12	m m m m m m m m m m m m c m^3 c degrees degrees m mm	*** ** ** ** ** ** ** ** ** *		Inside dimension to finished concrete from finished concrete wall at each end space for purification system calculated to withstand hydrostatic pressure from finished concrete wall at each end Maintain LAr cover over detector & proper ullage. General tolerances from GTT
Primary access Secondary access Concrete pit thickness Pit Width Pit Depth Pit Length per cryostat Septum pit clear width Setpum wall thickness Septum total width Pit length for two cryostats Pit Volume per cryostat Pit Surface Area per cryostat Maximum angle of incline/decline for drive-in access Maximum angle of incline/decline for drifts other than drive-in access Pit floor tolerance to horizontal plane Pit concrete flatness requirement Pit length, width, depth, tolerance	existing drifts 0.5 26.1 18.0 50.6 15.0 1.5 18.0 23791 5407 12 15 0.1 +/- 12 +/- 30	m m m m m m m m m m m m 2 degrees degrees m mm mm	*** ** ** ** ** ** ** ** ** *		Inside dimension to finished concrete from finished concrete wall at each end space for purification system calculated to withstand hydrostatic pressure from finished concrete wall at each end Maintain LAr cover over detector & proper ullage. General tolerances from GTT General tolerances from GTT
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